



Leiomyosarcoma of the anal canal: A case report

Norman M. Rowe ^{a,*}, Irina E. Meisher ^b, Kedamdaby P. Sheka ^a,
Vinod Bopaiah ^a

^a Department of Surgery, 7 North-32, Coney Island Hospital, 2601 Ocean Parkway, Brooklyn, NY 11235, USA

^b Department of Pathology, Coney Island Hospital, Brooklyn, NY 11235, USA

KEYWORDS

Leiomyosarcoma;
Anal canal;
Sphincter preservation;
Abdominoperoneal
resection

Abstract *Background:* Leiomyosarcoma (LMS) of the colon, rectum, and anus comprise less than 0.1% of all rectal malignancies with isolated leiomyosarcomas of the anal canal representing only eight reported cases. We report one more case and a review of the world literature. *Case report:* An 80-year-old male presented with a complaint of bright red blood per rectum, constipation, and a subjective history of a rectal mass diagnosed 3 years prior. Pertinent findings on physical exam included a hard, non-mobile mass in the anus which biopsy showed to be a LMS. The patient only wished to have a local excision of the mass performed. At the time of operation the perianal mass extended from the external sphincters into the anal canal. The mass was excised with clean margins. The patient refused adjuvant therapy. Approximately 7 months later, the patient was found to have a local recurrence. At this time the patient opted for local excision and radiotherapy.

Conclusion: Isolated LMS of the anus is an extremely rare finding with only eight previous reports in the world literature. LMS is an aggressive tumor with a high local recurrence rate as well as significant hematogenous spread. Due to its rarity, there is insufficient data regarding the optimal treatment. Our literature review has displayed some limited preference for radical surgery over local excision, which may in turn lead to a better outcome.

© 2007 Surgical Associates Ltd. Published by Elsevier Ltd. All rights reserved.

Introduction

Leiomyosarcoma (LMS) of the colon, rectum, and anus comprise less than 0.1% of all rectal malignancies.^{1,2} Cancer of the anal canal comprises only 2% of all colonic malignancies. LMS is a mesenchymal tumor that originates from smooth muscle cells. Aggressive behavior is usually found in tumors with greater than 10 mitoses/10 high-powered

field (hpf). Additionally, necrosis, increased cellularity with cytological atypia, or size greater than 5 cm in diameter are all features suggestive of malignancy. It occurs more frequently in women, with the majority of the LMS being in the uterus and uterine/adnexal ligaments. Some LMS appear to grow under estrogenic influence, which may explain the above finding.³ The one exception is the cutaneous variant, which is seen as frequently, if not more often, in males.³ This tumor can be found at any age but has a particular predilection in the fifth and sixth decades of life.

Standard staining with hematoxylin and eosin and trichrome are used to determine the cells of origin, which

* Corresponding author. Tel.: +1 718 616 3440; fax: +1 718 616 4436.

E-mail address: nmrowe1@yahoo.com (N.M. Rowe).

are smooth muscle cells. Histological diagnosis is made when spindle cells exhibit storiform and palisading appearance and are grouped in bundles. The nuclei display pleomorphic characteristics as well as atypia. Additionally, immunohistochemical staining can elucidate the tumor type. Cytokeratin, a marker for epithelial tumors, and vimentin antibodies, which is a non-specific marker of smooth muscle, can be used. Desmin is used to make the distinction between well and poorly differentiated tumors (desmin being present in well differentiated tumors). Smooth muscle actin (SMA) receptors are normally present in smooth muscle and vessels, but are a sign of smooth muscle tumors when the location of the staining is interdigitated with tissues of other cell lines and in inappropriate locations. Staining for S100 receptors is used to exclude malignant melanoma and neural tumors. In this test some mild staining can also be normal as this stain can be taken up in host cells of the immune system.

It is important to note that while all LMS have a common histologic definition, the biologic action differs depending on the location of the tumor. It is for this reason that LMS are broken up into three groups: retroperitoneal and intraabdominal, cutaneous and subcutaneous variant, as well as those of vascular origin.³

Leiomyosarcoma of the anus is an even more rare entity with only eight cases reported in the world literature.^{1,2,4–8} Given the uncommon nature of this tumor in this location and the lack of specific data in some of the previously reported cases (i.e., precise location of tumor, specific treatment and adjuvant therapy and follow-up), consensus about its treatment is surrounded by much controversy. We can only surmise what may be the most appropriate treatment based on the management of epithelial tumors at this site. Therefore, herein we report one more case of LMS of the anal canal and a review of the world's literature in an attempt to provide insight into the most appropriate treatment for this unusual tumor of the anal canal.

Case report

An 80-year-old Slavic male with a subjective history of a "rectal mass" diagnosed 3 years prior presented with complaint of bright red blood per rectum and constipation for 2 days. There was no history of external hemorrhoids. He stated that this was the first episode of its kind he had experienced. He denied any recent weight loss. Both past medical history and past surgical history were non-significant. He had a 40-pack year history of cigarette smoking, denied alcohol use and the only medications he was taking on a regular basis were stool softeners.

On physical exam there was a mass noted on the left, posteriolateral position in the anal canal; approximately 3 cm from the anal verge. It was an approximately 10 × 10 cm hard, non-mobile perianal mass. Routine abdominal x-rays were unremarkable except for fecal impaction. The preoperative serum carcinoembryonic antigen level was essentially normal with a value of 1.5 µg/L. The anoscopic biopsy results showed features suggestive of malignancy when examined via hematoxylin and eosin staining (namely, cellular atypia) (see Fig. 1). Biopsy tissue examined immunohistochemically via the immunoperoxidase technique was positive for vimentin,

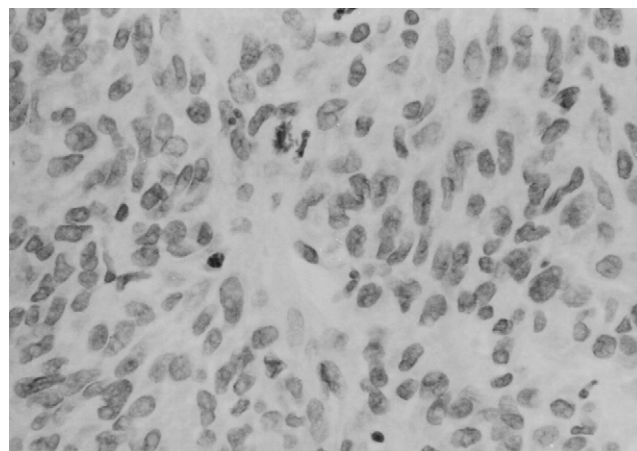


Figure 1 Anoscopic biopsy showed features suggestive of malignancy, namely, cellular atypia (hematoxylin and eosin, magnification is 40×).

smooth muscle actin and rare immunoreactive cells to desmin. These findings suggested that the tumor was of mesenchymal origin, more specifically of smooth muscle. The relative lack of staining of desmin in this tissue excluded a well differentiated tumor (see Fig. 2A and B). Tissue was negative for receptors for cytokeratin, prostatic specific antigen, prostatic basal cell antigen and leukocyte common antigen. This excluded epithelial tumors (cytokeratin) and malignant melanoma.

A CT scan of his abdomen and pelvis with oral and intravenous (IV) contrast showed a mass in the anus with no evidence of local invasion or metastasis (see Fig. 3). MRI of the pelvis showed a large anal mass nearly occluding the entire anal canal. The T2 weighted MRI displayed that the mass had a similar density as the surrounding skeletal muscle (see Fig. 4). Triphase bone scan was negative for evidence of metastases. The patients' preoperative work-up displayed a tumor that was highly suggestive of a leiomyosarcoma. When offered surgery, the patient refused any radical procedure (abdominoperineal resection) but agreed to local excision only with no postoperative adjuvant therapy.

Gross operative findings included a perianal, fungating mass extending into the distal rectum from the anal canal. Upon further dissection, the tumor was found to arise from the soft tissues around the anal canal (namely, the external sphincters) with no mucosal involvement. The surgical procedure included a transanal excision of the mass with preservation and primary reconstruction of the perianal area and sphincters. The excised mass was 6 × 6 × 4.5 cm, dumbbell shaped, and weighed 90 g (see Fig. 5A). Transection of the mass showed that the nodular portions were completely necrotic with cystic and hemorrhagic changes (see Fig. 5B). These gross findings were consistent with a high grade LMS. The features seen on hematoxylin and eosin staining were consistent with malignancy. These features included plump, pleiomorphic, palisading, atypical nuclei and cytoplasmic inclusions. Deep margins were noted to be free of malignant cells, however the lateral submucosal margins could not be adequately evaluated. More importantly, the greater than 10 mitoses/10 hpf was consistent with

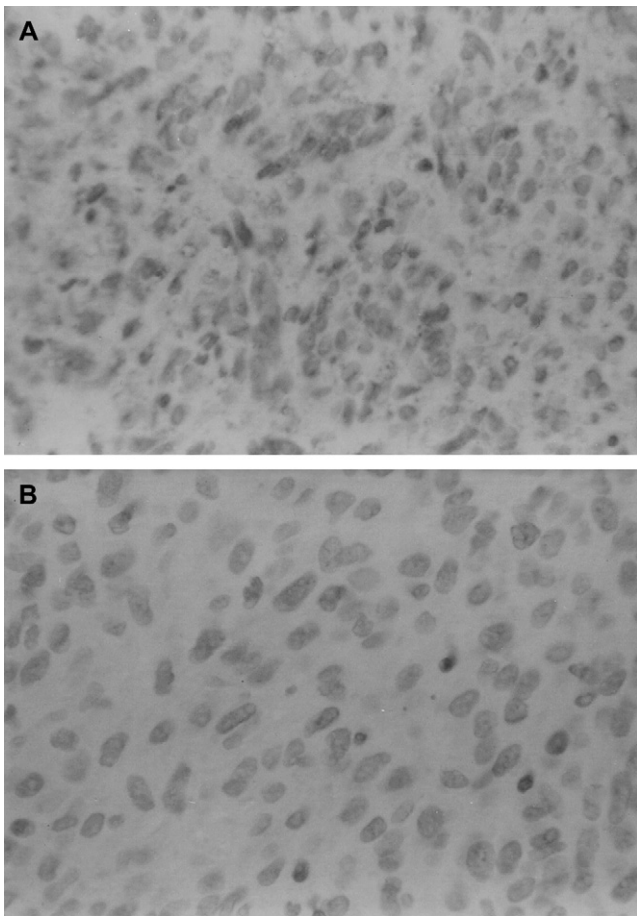


Figure 2 (A) Biopsy tissue examined immunohistochemically was positive for smooth muscle actin (SMA). These findings suggested that the tumor was of mesenchymal origin, more specifically of smooth muscle (immunohistochemistry for SMA, magnification is 40 \times). (B) The relative lack of staining of desmin in this tissue excluded a well-differentiated tumor (immunohistochemistry for desmin, magnification is 40 \times).

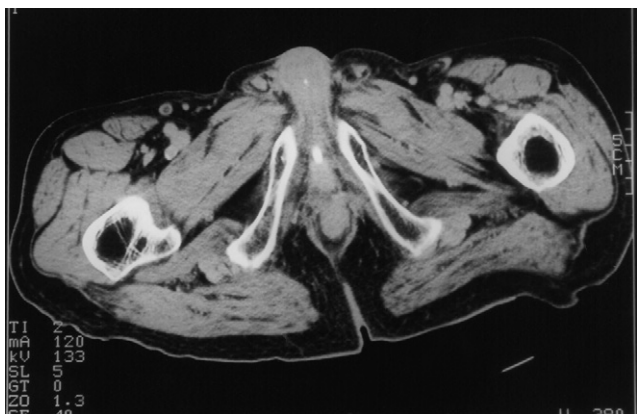


Figure 3 Image showing axial view of a CT scan of the patient's abdomen and pelvis with oral and intravenous contrast displayed a mass in the anus. There was no evidence of local invasion or metastasis.



Figure 4 Image showing sagittal view of a T2 weighted MRI of the patients pelvis showed a large mass in the anus nearly occluding the entire anal canal. On the T2 weighted image, it had a similar density as the surrounding the skeletal muscle. This was consistent with a leiomyosarcoma.

a high-grade malignancy (see Fig. 6). The negative cytokeratin stain showed that this tumor was of mesenchymal origin. The trichrome as well as the desmin staining were evidence of the smooth muscle origin of this tumor. This tumor showed all the features of malignancy (i.e. large, abnormal, pleomorphic nuclei with many mitoses and coarse chromatin structure). Also apparent was a high nucleus to cytoplasm ratio, another feature pathognomonic for malignancy. The patient refused adjuvant therapy.

Bimonthly examinations and anoscopy performed the first 6 months after surgery were unremarkable. In the seventh post-operative month there was noted to be a thickened area of scar via anoscopic examination. The patient again refused a radical procedure and agreed only to local excision of the area in question. The excised scar mass showed features similar to the previously excised tumor with greater than 15 mitoses/10 hpf, characteristic of high-grade smooth muscle malignancy (demonstrating local recurrence of the LMS) (see Fig. 7). This tumor was of a higher grade than the originally excised one as is evidenced by the increased mitotic figures. The tumor margins were free of malignant cells. At this time the patient agreed to a course of external beam radiotherapy.

One month after the repeat excision, a CT scan of the abdomen and pelvis with oral, rectal, and IV contrast was performed. It was significant only for prostatism, with no

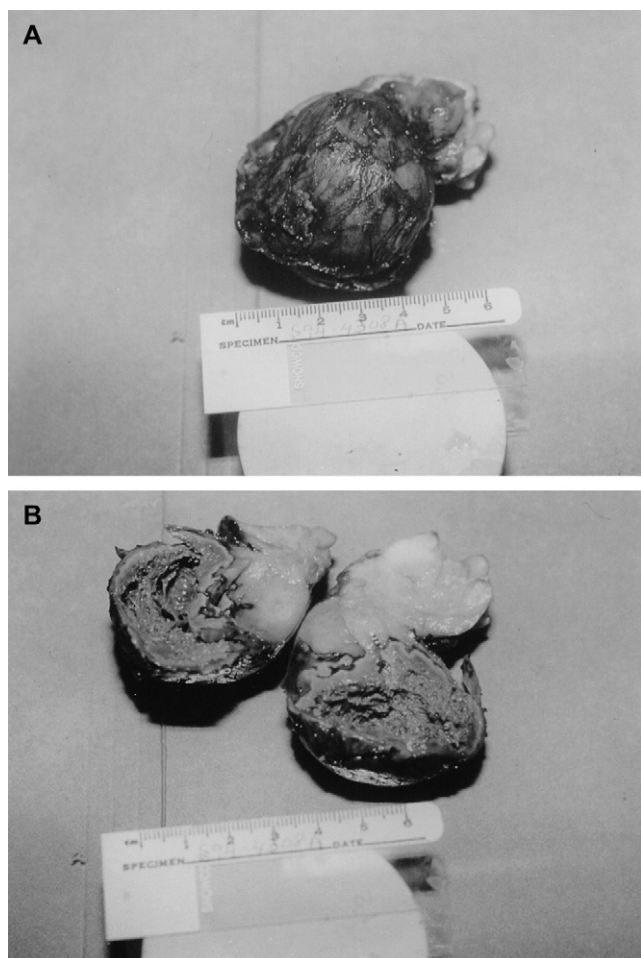


Figure 5 (A) The excised anal mass was $6 \times 6 \times 4.5$ cm, dumbbell shaped, and weighed 90 g. (B) Transection of the mass showed that the nodular portions were completely necrotic with cystic and hemorrhagic changes.

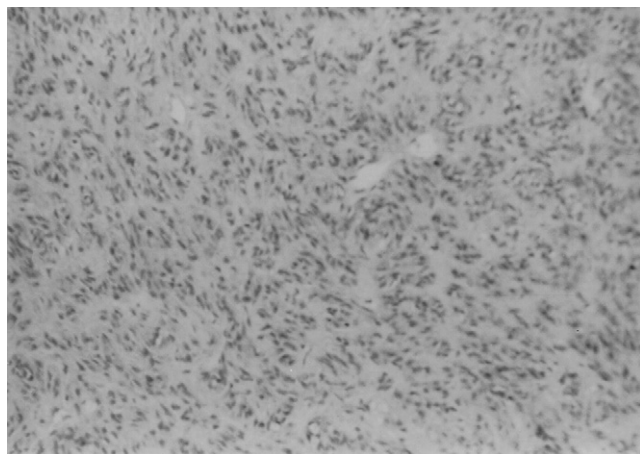


Figure 6 The histology of the resected specimen displayed plump, pleiomorphic, palisading, atypical nuclei and cytoplasmic inclusions. There was greater than 10 mitoses/10 hpf was consistent with a high-grade malignancy (hematoxylin and eosin, magnification is $10\times$).

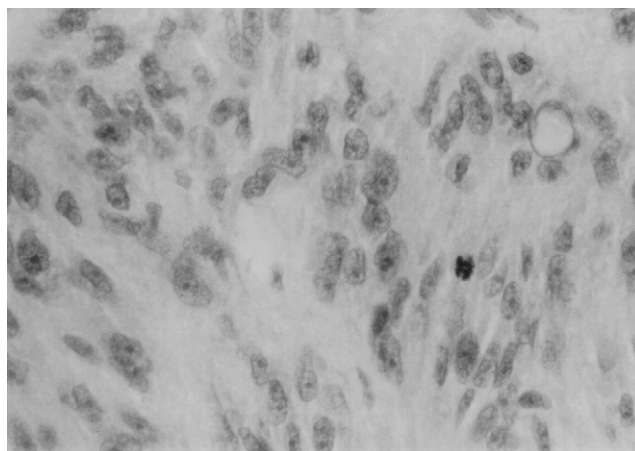


Figure 7 The excised scar mass showed features similar to the previously excised tumor with greater than 15 mitoses/10 hpf, characteristic of high-grade smooth muscle malignancy (demonstrating local recurrence of the LMS) (hematoxylin and eosin, magnification is $40\times$).

evidence of masses. A CT scan of the chest with IV contrast was also performed that showed no abnormal pathology. After this, the patient was lost to follow-up.

Discussion

Leiomyosarcomas (LMS) of the large intestines are rare neoplasms, comprising less than 0.1% of all malignancies of the colon and rectum.^{1,2} Despite this, LMS are the most common non-epithelial gastrointestinal malignant neoplasms (with squamous cell carcinoma being the most common anal malignancy).^{1,9} The most common site for LMS is the stomach, followed by the small intestine, then the colon and rectum.^{4,10} Furthermore, isolated LMS of the anal canal is exceedingly rare with only eight reported cases in the world literature. The first reported case of LMS of the anus in the world literature was a case by Wolfson and Oh in 1977.⁷ After a thorough search of the world literature, only seven cases followed.^{1,2,4-8} LMS of the gastrointestinal tract are most commonly seen during the fifth and sixth decades of life, although there are exceptions with rare cases being reported in infants and children.^{4,11} The tumor may arise from the smooth muscle of the muscularis propria, muscularis mucosa, or blood vessels musculature. Dual leiomyosarcomas may also develop from the arrectores pilorum muscles of the subcutis, although the large tumor size usually prevents precise determination of site of origin. Akwari et al. reviewed 108 cases of primary intestinal leiomyosarcoma and reported only two arising in the anus.¹² They concluded that the main factor in determining survival was the histologic grade, while the site and size of the primary tumor did not affect survival rate (except when neighboring tissues or organs were involved and not completely excised). Hematogenous metastasis most commonly to the lungs or liver, occurred in 90% of those who die, while regional lymph node metastasis were relatively uncommon, seen in only 6% of patients.¹ This was also observed by Kiss and Menesi.¹³

Due to its rarity and the sparse published data, the treatment for LMS of the large intestine is controversial. This fact is compounded for LMS of the anal canal. A considerable amount of the details concerning the extent of the disease, specific details concerning treatment, adjuvant therapy and follow up are lacking in the international literature, making a consensus statement of optimal treatment difficult. Minsky et al. writes that while the optimal treatment for anal LMS cannot be determined due to limited patient population, management decisions must be based on the treatment results of the more common epithelial tumors arising in this region, such as squamous cell carcinoma.^{4,9}

While it would at first seem preposterous to look at epithelial tumors to help dictate treatment for non-epithelial, mesenchymal tumors, it is known that smooth muscles tumors arising in different sites usually behave biologically different and have more commonalities with other tumors arising from that particular region.¹⁴ The cases that describe local resections for anal leiomyosarcoma list recurrences as a major complication. Diamante and Bacon list the recurrence rate to be 86% for rectal LMS after local excision.¹⁵ The standard surgical therapy for epithelial tumors is abdominoperineal resection (APR) because local excision alone is associated with a 75–100% incidence of local recurrences for lesions greater than 2.5 cm.⁴ Quan and Berg report that the optimal treatment for low grade tumors and those less than 2.5 cm in diameter was a wide local excision followed by interstitial radiation, while those larger than 2.5 cm were best treated by early APR.¹⁶ However, Nigro reports that external irradiation in combination with 5-fluorouracil and mitomycin has a 5-year survival of 78%.¹⁷ This rate is superior to that of APR combined with chemotherapy, or APR combined with radiation. Residual tumor after combined therapy and unresponsive bulky tumors are treated by local excision¹⁸ or APR.¹⁹ Combined chemotherapy and radiation therapy (chemoradiation therapy) may thus negate a permanent colostomy, making it very attractive to both the patient and the physician.

Therefore, even when a radical procedure is not an option, local excision followed by radiation therapy may be a suitable alternative. One sequelae of this treatment modality is the serious side effects of the high dose of radiation needed to treat anal cancers, particularly tissue necrosis.²⁰ In order to overcome this problem, Papillon recommends split course megavoltage XRT followed by brachytherapy with iridium-192 implants.²¹

Patients who do relapse locally have no increase in metastatic disease when compared with those with local recurrence following radical surgery, and surgical salvage remains an option.

In the case of the patient described, local excision was chosen because the patient opted for a sphincter preserving procedure. However, even after his recurrence, there was no evidence of metastases. Therefore a radical procedure still could have been an option. Consequently the initial local excision did not harm the patient.

In summary, the optimal treatment for leiomyosarcoma of the anus is not known. The gold standard surgical treatment for resectable tumors of the anal region is APR. In selected patients conservative surgery followed by external beam and interstitial radiation therapy may be

an alternative to radical surgery, with the goals of local control of the disease and anal sphincter preservation. It seems sound to presuppose that while local excision does correlate with a greater recurrence rate, it does not correlate with a greater mortality rate, and has the benefit of being more easily followed for local recurrence. However, more experience and longer follow up are needed before this approach could be recommended routinely.

Conclusions

Leiomyosarcoma of the anus is an extremely rare neoplasm affecting a fraction of 0.1% of all patients gastrointestinal cancers.^{1,2} To date there have only been eight cases reported in the world literature.^{1,2,4–8} Due to the scarcity of this condition and the lack of specific data in some of the previously reported cases, the optimal treatment can only be derived from similar conditions. At present, while recurrence rates are higher when local excision is used with adjuvant therapy, mortality is not increased by this choice. With local excision, radiation, and close follow-up, a patient may be able to be managed safely and possibly avoid a more radical procedure.

Conflicts of interest

None.

Funding

None.

Ethical approval

Not required.

References

1. Minsky BD, Cohen AM, Hajdu SI. Conservative management of anal leiomyosarcoma. *Cancer* 1991;**68**(7):1640–3.
2. Walsh TH, Mann CV. Smooth muscle neoplasms of the rectum and anal canal. *Br J Surg* 1984;**71**(8):597–9.
3. Chang AE, Madewell JE, Rosenberg SA, Moser RP. In: Enzinger FM, Weiss SW, editors. *Soft tissue tumors*. St. Louis, MO: C.V. Mosby; 1988. p. 402–21.
4. Minsky BD, Mies C, Rich TA. Leiomyosarcoma of the anus treated with sphincter-preserving surgery and radiation therapy. *J Surg Oncol* 1986;**32**(2):89–91.
5. Porwal KK, Tiwari S, Pendse AK. Anal leiomyosarcoma. *Trop Gastroenterol* 1996;**17**:187–91.
6. Randleman Jr CD, Wolff BG, Dozois RR, Spencer RJ, Weiland LH, Ilstrup DM. Leiomyosarcoma of the rectum and anus: a series of 22 cases. *Int J Colorectal Dis* 1989;**4**(2):91–6.
7. Wolfson P, Oh C. Leiomyosarcoma of the anus: report of a case. *Dis Col Rectum* 1997;**20**(7):600–2.
8. Grann A, Pary PB, Guillem JG, Cohen AM, Minsky BD. Sphincter preservation of leiomyosarcoma of the rectum and anus with local excision and brachytherapy. *Dis Colon Rectum* 1999;**42**: 1296–9.
9. Klas JV, Rothenberger DA, Wong WD, Madoff RD. Malignant tumors of the anal canal: the spectrum of disease, treatment, and outcomes. *Cancer* 1999;**85**:1686–93.
10. Haque S, Dean PJ. Stromal neoplasms of the rectum and anal canal. *Hum Pathol* 1992;**23**(7):762–7.

11. Labow SB, Hoexter B. Leiomyosarcoma of the rectum: radical vs. conservative therapy and report of three cases. *Dis Colon Rectum* 1997;**20**:603–8.
12. Akwari OE, Dozois RR, Weiland LH, Beahrs OH. Leiomyosarcoma of the small and large bowel. *Cancer* 1978;**42**:1375–84.
13. Kiss FG, Menesi R. Leiomyosarcoma of the anal area. *Zentralbl Chir* 1989;**114**(10):681–3.
14. Tjandra JJ, Antoniuk PM, Webb B, Petras RE, Fazio VW. Leiomyosarcoma of the rectum and anal canal. *Aust N Z J Surg* 1993;**63**(9):703–9.
15. Diamante M, Bacon HE. Leiomyosarcoma of the rectum: report of a case. *Dis Colon Rectum* 1967;**10**:347–51.
16. Quan SH, Berg JW. Leiomyoma and leiomyosarcoma of the rectum. *Dis Colon Rectum* 1962;**5**:415–20.
17. Nigro ND. Multidisciplinary management of cancer of the anus. *World J Surg* 1987;**11**:446–51.
18. Parks AG. Squamous carcinoma of the anal canal. *Ann Gastroenterol Hepatol* 1987;**17**:103–9.
19. Rosai J, editor. *Ackerman's surgical pathology*. 7th ed. St. Louis, MO: C.V. Mosby; 1989. p. 234–51.
20. Dolby JE, Poinston RS. The treatment of anal carcinoma by interstitial radiation. *Am J Roentgenol* 1961;**85**:515–20.
21. Papillon J, editor. *Rectal and anal cancers*. Berlin: Springer-Verlag; 1982. p. 138–54.